

Ongoing Coastal Wetland Monitoring

Conduct ongoing monitoring of coastal wetlands to determine variations and trends over the long term

This best practice focuses on biological and other scientific monitoring as a way to provide field-level data for assessment of wetland status and functional change over time. Ongoing monitoring is essential to understand how wetlands are changing over time, both in extent and condition. What is more difficult to determine is the extent to which observed changes are evidence of degradation due to anthropogenic stresses, impacts of natural processes, impacts of human interventions (e.g., restoration), or some combination of these. More difficult still is determining direct cause and effect between any single management action, indirect human activity and an ecological outcome.

Monitoring is also an essential component of effective indicator implementation (see Best Practice #16). Some of the monitoring needed to inform adaptation work might already be covered through existing coastal wetlands monitoring efforts, however, modification or expansion of wetland monitoring indicators

should be explored for climate-specific monitoring needs, and climate-related monitoring indicators should be incorporated into existing monitoring programs to minimize effort and redundancy. Such monitoring can also help in assessing the effectiveness of adaptation actions, and it is important that the monitoring plan for any project be designed to meet all of the intended needs.

It is essential to specify what is to be monitored and measured, how it will be monitored (what methods will be used), when (the timing of monitoring) and how frequently. Because understanding system responses to long-term change and variability requires long-term data, practitioners should use past monitoring results

or other historical information to inform their monitoring programs. This can significantly lengthen the period over which analysis can be done. In cases where historical data are minimal or even largely absent in a given project area, it is important to obtain good baseline data prior to project activities, to ensure a better understanding of the system response to project actions.

Monitoring plans should include a schedule for regular data analysis to look for trends and variations (including trend analysis as discussed in Best Practice #11) to assess progress toward stated goals and objectives. Ideally, raw monitoring results as well as analysis of individual data sets should be made available in ways that allow other resource management agencies and interested parties to compile monitoring results across landscapes to identify broader trends. Uploading metadata for the monitoring data into various regional data portals is a good way to allow people to discover that the data exists while managing access to it.

Monitoring entails the collection of data that can be measured. The item that is measured through monitoring is the metric. When the metric is applied toward a goal or objective, it functions as an indicator. Thus monitoring is essential for effective indicator implementation—the assessment of change or progress toward ecosystem goals and objectives (see Best Practice #16).



Saginaw Bay, Michigan, United States

Case Example | Great Lakes Coastal Wetlands Consortium Monitoring Plan

The Great Lakes Coastal Wetlands Consortium (GLCWC) was formed in 2000 to develop and implement a regional monitoring program to track coastal wetland condition. Following implementation of pilot projects, the Great Lakes Coastal Wetland Monitoring Plan, a compilation of recommended protocols for monitoring fish, invertebrates, birds, amphibians, vegetation, chemical/physical parameters and landscape parameters, was released in 2008. The monitoring plan is ambitious in that it sets universal monitoring protocols for all Great Lakes coastal wetlands even as it recognizes different classes of wetlands.

A five-year basinwide coastal wetland monitoring effort was funded through the Great Lakes Restoration Initiative in 2010 to implement the recommended monitoring protocols from the Great Lakes Coastal Wetland Monitoring Plan at more than 1,000 coastal wetlands throughout the Great Lakes. This project is being conducted through a partnership among 14 U.S. and Canadian universities and governmental agencies. Results are being made available through an online GIS resource at <http://greatlakeswetlands.org/>. It is important that data collected through monitoring activities be analyzed in the context of climate change to determine whether or not observed changes are climate-related (see Best Practice #11).



Challenges and Benefits

In areas where wetlands are extensively altered or managed, identifying trends and variability over time can be difficult. Monitoring is often seen as ancillary to wetland management or restoration. It can also be expensive, time consuming and may require expertise beyond existing capacity. However, monitoring is a critical step to evaluate the impact of any restoration effort. Funding for monitoring should be built in to coastal wetland restoration projects.

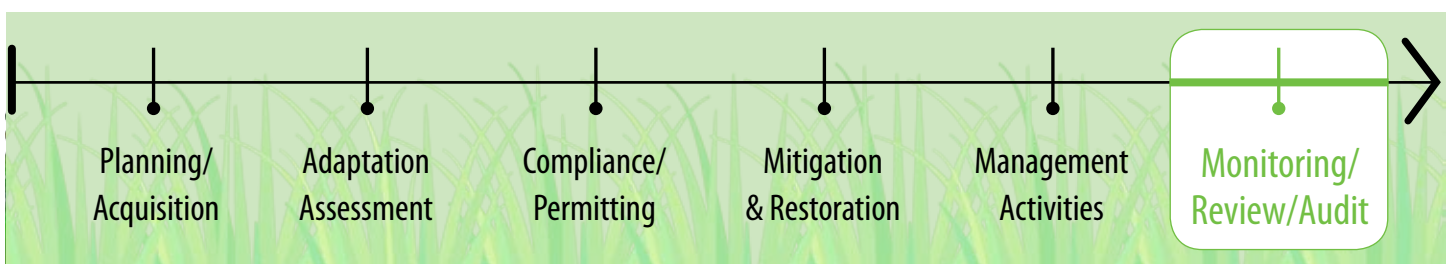
It is crucial to have adequate quality control measures in place to ensure reliable results and sufficient documentation of data. Restoration efforts entailing data collection funded by the Great Lakes Restoration Initiative require preparation of a Quality Assurance Project Plan. Alternative approaches to some intensive biological monitoring can also be considered (e.g., landscape level

monitoring through analysis of aerial or satellite imagery, modeling or rapid assessment methods), in particular where funding is not available, and the data or modeling methods are reliable and respected. If much of the monitoring is carried out by volunteers, it is important that adequate training and quality control practices are in place to ensure adequate data quality and consistency.

Who should implement the practice?

Organizations responsible for managing wetlands should establish ongoing monitoring on the sites for which they are responsible, or research entities should establish ongoing monitoring efforts for long-term, large or regional focus areas. As noted above, where funding or other resources for monitoring are not available, alternative methods to assess conditions and trends should be employed. In addition, entities carrying out wetland restoration projects should be conducting monitoring and should ensure adequate coverage of climate parameters as part of that monitoring. To the extent practicable, site-level monitoring should be linked with regional monitoring programs. Regional monitoring is best carried out by organizations or consortia with a broader scope (such as the GLCWC noted above, or other agency or nonprofit-led networks).

When should this practice happen?



Tools and Resources

National Oceanic and Atmospheric Administration – Water Level Observations | www.glerl.noaa.gov/data/now/wlevels/levels.html

National Oceanic and Atmospheric Administration – Water Level Dashboard tool | www.glerl.noaa.gov/data/dashboard/GLWLD.html

Great Lakes Coastal Wetlands Consortium – Great Lakes Coastal Wetlands Monitoring Plan (2008) | This plan was produced using a scientifically validated sampling design and a suite of indicators and metrics developed by project partners. It also includes a cost analysis chapter. |

glc.org/files/docs/Great-Lakes-Coastal-Wetlands-Monitoring-Plan-FINAL-March-2008.pdf

Implementing Great Lakes Coastal Wetland Monitoring (2013) | Presentation by Dr. Donald G. Uzarski at the 2013 National Conference on Ecosystem Restoration. | www.conference.ifas.ufl.edu/ncer2013/Presentations/4-Innovation/1-Tuesday/9-Session/YES/0140%20Don%20Uzarski.pdf

Great Lakes Coastal Wetland Monitoring Project Data Website | The goal of this project is to sample Great Lakes coastal wetland biota, habitat, and water quality to provide information on coastal wetland condition. | greatlakeswetlands.org

